

CLAIMS

What is claimed is:

- 1 1. A transparent article comprising
2 a thermoplastic polymer matrix;
3 a plurality of domains, each domain encompassing at least one
4 incompatible filler, dispersed in the polyester matrix, said domains having a
5 range of dimensions in an axial plane of said article, wherein said dimensions
6 of at least some of said domains in said axial plane of said article fall within a
7 range of from about 380 nm to about 720 nm; and
8 an effective amount of at least one light absorbent composition, wherein
9 said at least one composition absorbs light in a region of the visible spectrum
10 at wavelengths that at least substantially covers said range of dimensions of
11 said domains in said article, to substantially mask any visual haze of said
12 transparent article.

- 1 2. The transparent article of claim 1, wherein said transparent article is an
2 oriented container.

- 1 3. The transparent article of claim 1, wherein said transparent article is a plastic
2 bottle.

- 1 4. The transparent article of claim 1, wherein the thermoplastic polymer matrix
2 is selected from the group consisting of linear polyesters, branched polyesters,
3 polyamides, polystyrene, polycarbonates, polyvinylchlorides, polyvinylidene
4 dichlorides, polyacrylamides, polyacrylonitriles, polyvinylacetate, poly acid,
5 polyvinyl methyl ether, ethylene vinyl acetate copolymer, ethylene methyl
6 acrylate copolymer, low molecular weight polyolefins having 2 to 8 carbon
7 atoms, and copolymers, terpolymers, and blends thereof.

- 1 5. The transparent article of claim 4, wherein said thermoplastic polymer matrix
2 is a linear polyester matrix selected from the group consisting of polyethylene

- 3 terephthalate, polyethylene naphthalate, and polybutylene terephthalate,
4 polytrimethylene terephthalate, polyethylene isophthalate and copolymers,
5 terpolymers, and blends thereof.
- 1 6. The transparent article of claim 5, wherein said linear polyester matrix is
2 polyethylene terephthalate or a copolymer thereof.
- 1 7. The transparent article of claim 5, wherein said incompatible filler is selected
2 from the group consisting of thermoplastic polymers other than polyester and
3 clays.
- 1 8. The transparent article of claim 5, wherein said incompatible filler is a
2 polyamide.
- 1 9. The transparent article of claim 5, wherein said incompatible filler is poly(*m*-
2 xylylene adipamide).
- 1 10. The transparent article of claim 1, wherein said incompatible filler is a gas
2 barrier strengthening filler.
- 1 11. The transparent article of claim 4, wherein said thermoplastic polymer matrix
2 is a polyamide matrix and wherein said incompatible filler is a clay.
- 1 12. The transparent article of claim 1, wherein the article comprises from about
2 99.5 to about 50 percent by weight thermoplastic polymer and from about 0.5
3 to about 50 percent by weight incompatible filler.
- 1 13. The transparent article of claim 1, wherein said article comprises from about
2 99.5 to about 50 percent by weight polyethylene terephthalate and from about
3 0.5 to about 50 percent by weight poly(*m*-xylylene adipamide).

- 1 14. The transparent article of claim 1, wherein said light absorbent composition is
2 a colorant.
- 1 15. The transparent article of claim 1, wherein said light absorbent composition is
2 a pigment.
- 1 16. The transparent article of claim 1, wherein said dimensions of the domains
2 range from about 400 nm to about 600 nm and said light absorbent
3 composition is a red colorant.
- 1 17. The transparent article of claim 1, wherein said dimensions of the domains
2 range from about 550 nm to about about 750 nm, and said light absorbent
3 composition is a blue colorant.
- 1 18. The Transparent article of claim 1, wherein said transparent article is a
2 multilayer container and wherein at least one layer of the multi-layer container
3 includes the thermoplastic matrix having said incompatible filler dispersed
4 therein and at least one other layer of the multi-layer container includes the at
5 least one light absorbent composition.
- 1 19. A process for the production of a transparent article made of a blend of a major
2 component of polyester, a minor component of at least one incompatible filler
3 dispersed therein, and at least one light absorbent composition, comprising:
4 blending the filler into the polyester;
5 forming an article into a desired size and shape, wherein domains
6 comprising the incompatible filler are created in the polyester upon formation
7 of the article;
8 determining a range of dimensions in the axial plane of the article for the
9 domains in the polyester, at least some of the dimensions falling within a range
10 of from about 380 nm to about 720 nm; and
11 finding a light absorbent composition that absorbs light in a region of the

12 visible spectrum at wavelengths that at least substantially covers the range of
13 dimensions of the domains in the polyester; and
14 adding an effective amount of the light absorbent composition to the
15 polyester and the incompatible filler and forming a different, transparent
16 article into the same desired size and shape, to substantially mask any visual
17 haze in the article.

1 20. The process of claim 19, wherein the article produced in a container.

1 21. The process of claim 20, wherein the container produced is a bottle.

1 22. The process of claim 20, wherein said step of blending includes adding filler in
2 an effective amount to provide increased gas barrier strength to the container
3 as compared to a container comprising only polyester.

1 23. The process of claim 19, wherein said step of forming the article includes blow
2 molding the article to orient it into the size and shape of an article.

1 24. The process of claim 19, wherein the light absorbent composition is a colorant
2 and wherein said step of finding a light absorbent composition includes
3 reviewing the absorption spectra of the colorant.

1 25. The process of claim 19 wherein said step of adding a light absorbent
2 composition to the polyester includes the step of yellowing the polyester to
3 provide the light absorbent composition.

1 26. The process of claim 19, wherein said step of adding a light absorbent
2 composition to the polyester includes layering a film comprising light absorbent
3 composition over a layer of the article comprising the polyester matrix having
4 the incompatible filler dispersed therein.

1 27. A transparent article comprising:

2 a thermoplastic polymer matrix;

3 a plurality of domains, each encompassing at least one incompatible filler,
4 dispersed in the polyester matrix, the domains having a range of dimensions
5 in an axial plane of the article, wherein the dimensions of at least some of the
6 domains in the axial plane of the article fall within a range of from about 400
7 nm to about 700 nm; and

8 at least one light absorbent composition, wherein the at least one light
9 absorbent composition absorbs light in a region of the visible spectrum such
10 that X is less than 9.6 in an equation

$$11 \quad X = \sum (1 - A_i)^{x(N_i)}$$

12 where A_i is the percent of light absorbed at a wavelength i , where N_i is the
13 number of domains per hundred square microns at wavelength i , and where
14 i ranges from 400 nm to 700 nm.

1 28. The transparent article of claim 27, wherein said transparent article is an
2 oriented container.

1 29. The transparent article of claim 27, wherein said transparent article is a plastic
2 bottle.

1 30. The transparent article of claim 27, wherein the thermoplastic polymer matrix
2 is selected from the group consisting of linear polyesters, branched polyesters,
3 polyamides, polystyrene, polycarbonates, polyvinylchlorides, polyvinylidene
4 dichlorides, polyacrylamides, polyacrylonitriles, polyvinylacetate, poly acid,
5 polyvinyl methyl ether, ethylene vinyl acetate copolymer, ethylene methyl
6 acrylate copolymer, low molecular weight polyolefins having 2 to 8 carbon
7 atoms, and copolymers, terpolymers, and blends thereof.

1 31. The transparent article of claim 27, wherein said thermoplastic polymer matrix
2 is a linear polyester matrix selected from the group consisting of polyethylene

3 terephthalate, polyethylene naphthalate, and polybutylene terephthalate,
4 polytrimethylene terephthalate, polyethylene isophthalate and copolymers,
5 terpolymers, and blends thereof.

1 32. The transparent article of claim 31, wherein said linear polyester matrix is
2 polyethylene terephthalate or a copolymer thereof.

1 33. The transparent article of claim 27, wherein said incompatible filler is a
2 polyamide.

1 34. The transparent article of claim 27, wherein said incompatible filler is poly(*m*-
2 xylylene adipamide).

1 35. The transparent article of claim 27, wherein said incompatible filler is a gas
2 barrier strengthening filler.

1 36. The transparent article of claim 27, wherein the article comprises from about
2 99.5 to about 50 percent by weight thermoplastic polymer and from about 0.5
3 to about 50 percent by weight incompatible filler.

1 37. The transparent article of claim 27, wherein said article comprises from about
2 99.5 to about 50 percent by weight polyethylene terephthalate and from about
3 0.5 to about 50 percent by weight poly(*m*-xylylene adipamide).

1 38. The transparent article of claim 27, wherein said light absorbent composition
2 is a colorant.

1 39. The transparent article of claim 27, wherein X is less than 9.5.

1 40. The transparent article of claim 27, wherein X is less than 9.

1 41. The transparent article of claim 27, wherein X is less than 7.5.

1 42. A process for the production of a transparent article made of a blend of a major
2 component of polyester, a minor component of at least one incompatible filler
3 dispersed therein, and at least one light absorbent composition, comprising:

4 blending a selected amount of the filler into the polyester;

5 forming an article into a desired size and shape, wherein domains
6 comprising the incompatible filler are created in the polyester upon formation
7 of the article;

8 determining a range of dimensions in the axial plane of the article for the
9 domains in the polyester, at least some of the dimensions falling within a range
10 of from about 400 nm to about 700 nm;

11 blending a selected amount of light absorbent composition into the
12 polyester to determine that the light absorbent composition absorbs light in a
13 region of the visible spectrum such that X is less then 9.6 in the equation

$$14 \quad X = \sum (1 - A_i) \times (N_i)$$

15 where A_i is the percent of light absorbed at a wavelength i and N_i is the number
16 of domains per hundred square microns at wavelength i , and where i ranges
17 from 400 nm to 700 nm; and

18 adding that selected amount of the light absorbent composition to the
19 polyester and the selected amount of incompatible filler and forming a
20 different, transparent container into the same desired size and shape, thereby
21 substantially masking any visual haze in the article.

1 43. The process of claim 42, wherein the article produced in a container.

1 44. The process of claim 43, wherein the container produced is a bottle.

1 45. The process of claim, 43 wherein said step of blending includes adding filler in
2 an effective amount to provide increased gas barrier strength to the container
3 as compared to a container comprising only polyester.

- 1 46. The process of claim 42, wherein said step of forming the article includes blow
2 molding the article to orient it into the size and shape of an article.
- 1 47. The process of claim 42, wherein the light absorbent composition is a colorant.
- 1 48. The process of claim 42, wherein X is less than 9.5.
- 1 49. The process of claim 19, wherein X is less than 9.
- 1 50. The process of claim 27, wherein X is less than 7.5.
- 1 51. A method for masking visual haze in a transparent article including a major
2 component of polyester and a minor component of at least one incompatible
3 filler, comprising:
4 altering light absorption of the transparent article at wavelengths that at
5 least substantially correlate with dimensions, in the axial plane of the article,
6 of domains in the thermoplastic polymer created upon formation of the article
and containing the incompatible filler.